BUREAU OF ECONOMIC GEOLOGY
THE UNIVERSITY OF TEXAS AT AUSTIN
AUSTIN, TEXAS 78712

W. L. FISHER, ***Director***

GEOLOGIC QUADRANGLE MAP NO. 47

Geology of the Round Mountain Quadrangle, Blanco, Burnet, and Llano Counties, Texas

BY
VIRGIL E. BARNES

map & text

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GEOLOGY OF THE ROUND MOUNTAIN QUADRANGLE, BLANCO, BURNET, AND LLANO COUNTIES, TEXAS

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CONTENTS

GENERAL SETTING

Round Mountain quadrangle is in the eastern part of the Llano region. The southern part of the quadrangle is in the Pedernales River basin, and the northern part drains directly into the Colorado River system of lakes.

The geology of the Round Mountain quadrangle is shown on a U. S. Geological Survey 7.5-minute topographic quadrangle map; this is the thirteenth geologic map of the Llano region to appear on a modern 1:24,000 scale, 20-foot contour interval base. The relief in the quadrangle is about 685 feet; elevations range from about 910 feet where Double Horn Creek leaves the quadrangle to 1,595 feet at the top of Round Mountain.

About 53 percent of the Round Mountain quadrangle is drained eastward to Pedernales River by Cypress Creek and its tributaries including Stribling Creek, North Cypress Creek, and Cleveland Branch. A very small area tributary to Cottonwood Creek drains southward to Pedernales River. The remainder of the quadrangle is drained northward and northeastward by Slickrock Creek to Lake Lyndon B. Johnson, Flatrock Creek and its tributary Little Flatrock Creek to Lake Marble Falls, and Double Horn Creek to Lake Travis.

Round Mountain quadrangle is high on the southeastern side of the Llano uplift. Paleozoic rocks occupy about 30 square miles, and except for some alluvium the rest of the quadrangle is underlain by Cretaceous rocks. The Paleozoic rocks form a broad, east-northeastward, gently plunging, somewhat faulted anticline. The relatively flat-lying Cretaceous rocks dip eastward about 13 feet per mile.

The geology of the Round Mountain quadrangle was mapped, and a gravity survey was made primarily during 1947-1948. Discussions of stratigraphic, structural, economic, and geophysical problems are in cited references.

GEOLOGIC FORMATIONS

PALEOZOIC ROCKS

CAMBRIAN SYSTEM (UPPER CAMBRIAN)

Moore Hollow Group

For a summary of information on Cambrian rocks of Central Texas, the reader is referred to Bell and Barnes (1961), and for a detailed discussion, see Barnes and Bell (1977). Thickness data for Cambrian units are taken from the latter publication. The Wilberns Formation ranges in thickness from 580 to 600 feet and the Riley Formation from 730 to 790 feet.

Wilberns Formation

Morgan Creek Limestone Member.—The Morgan Creek Limestone crops out 1 mile southwest of Round Mountain, and it is likely that only the portion above the *Eoorthis* zone is present. The lowest exposed strata are coarse-grained to medium- and fine-grained limestone beds 4 to 12 inches thick. The limestone is medium to light gray and greenish gray and glauconitic in some beds; patches of brownish yellow dolomite along the bedding and scattered dolomite rhombs are common. In the upper part of the member, similar limestone alternates with argillaceous, silty, fine-grained, thinly bedded, greenish gray to brownish gray limestone and some intervals of stromatolites. The total thickness of the Morgan Creek Limestone, including the portion in the subsurface, is about 140 to 145 feet. Trilobites and brachiopods are common, but no collections were made.

Point Peak Member.—The Point Peak Member crops out contiguous to the Morgan Creek Limestone described above. As was done for the Howell Mountain quadrangle, the massive stromatolite zone normally included in the top part of the Point Peak Member is included with the San Saba Member as a calcitic facies because of the intergradational relationship of the stromatolites with the overlying dolomite. The Point Peak is primarily argillaceous siltstone and silty shale interbedded with some limestone intraformational conglomerate, stromatolite beds, and a few beds of coarse-grained limestone. Glauconite is common except in the stromatolites. The thickness of the Point Peak Member within the quadrangle ranges from about 20 to 80 feet.

Silicified *Billingsella* are common in some beds in the lower part of the Point Peak Member. Bell and Ellinwood (1962) described fossils from the Point Peak elsewhere in the Llano region.

San Saba Member.—Subsequent to the publication of the Blowout and North Grape Creek quadrangle maps (Barnes, 1952a, 1952b), Barnes and Bell (1954) proposed a change in nomenclature to bring Wilberns terminology into conformity with Ellenburger terminology. The names "Pedernales Dolomite" and "San Saba Limestone" on the maps and in the texts of these quadrangles are no longer used. Instead, these rocks are included in the San Saba—the top member of the Wilberns Formation. Where dolomite and limestone are mapped separately, they are shown as dolomitic and calcitic facies of the San Saba Member and are comparable in rank to the dolomitic and calcitic facies mapped in the overlying Threadgill Member, and to other units of the Ellenburger Group.

The San Saba Member crops out in the vicinity of Round Mountain and along Cypress and North Cypress Creeks in one large area interrupted by alluvium. A second outcrop, crossed by U. S. Highway 281, is in the bed of Cypress Creek 3 miles southwest of Round Mountain. Both dolomitic and calcitic facies of the San Saba are present. The calcitic facies is massive stromatolitic limestone exposed in the bed of North Cypress Creek for 0.4 mile about 1 mile west of Round Mountain. Southwest of Round Mountain, the calcitic facies, not separated from the Point Peak Member, grades upward and laterally to dolomitized stromatolites, and dolomitization fluctuates through several tens of feet, as shown by the symbol for lateral gradation on the map.

The dolomitic facies consists of a central coarse-grained unit between lower and upper fine-grained units. The fine-grained dolomite is commonly cherty and well bedded, whereas the coarse-grained unit is noncherty and massive. Some glauconite was seen locally in the dolomite in the bed of Cypress Creek 3 miles southwest of Round Mountain.

The thickness of the San Saba Member within the quadrangle is about 360 to 430 feet. Although fossils commonly can be found in the chert, no collections were made.

ORDOVICIAN SYSTEM (LOWER ORDOVICIAN)

Ellenburger Group

Tanyard Formation

Threadgill Member.—In the Round Mountain quadrangle the position of the San Saba - Threadgill boundary in reference to the position of the Cambrian-Ordovician boundary is unknown because of lack of paleontologic evidence. The uppermost part of the San Saba could be Ordovician, or the lower part of the Threadgill could be Cambrian. The boundary between the members, where in dolomite, is placed at the top of the fine-grained dolomite above the highest Cambrian fossils and at the bottom of coarse-grained dolomite below the lowest Ordovician fossils.

The Threadgill Member crops out in the upper reach of Slickrock Creek and along Cypress and North Cypress Creeks south of Round Mountain, where it is probably about 90 feet thick. Some of the upper contact in the vicinity of Slickrock Creek is in a collapse breccia caused by solution, and solution has thinned the unit to the west in the Howell Mountain quadrangle in places to as little as 25 feet.

South of Round Mountain the Threadgill is mostly coarse-grained dolomite with one thin discontinuous outcrop of aphanitic limestone at its base. Along Slickrock Creek the Threadgill is about equally coarse-grained dolomite and aphanitic limestone, and the limestone grades entirely to dolomite westward. No fossils were seen.

Staendebach Member.—The Staendebach Member, interrupted by one fault and Cretaceous overlap, forms a mile-wide outcrop in the northwestern part of the quadrangle and an outcrop about 3 miles in width along Cypress Creek. Four small outcrops are at the head of Double Horn Creek. The thickness of the Staendebach has not been measured within the quadrangle, but on the basis of measurements of 353 feet in the Riley Mountains and of 415 feet in the Johnson City area, it is probably about 375 feet thick. Except for numerous outcrops of aphanitic limestone near the top of the Staendebach, the member is dominantly fine-grained cherty dolomite. The upper contact for long distances is in a collapse breccia, indicating that limestone formerly present in the Staendebach has been removed by solution. Chert, characteristic of the Staendebach, is mostly porcelaneous, white to off-white, dolomoldic to compact, in part oolitic, and fossiliferous.

Ten fossil collections made from Staendebach chert have been identified by W. C. Bell, Department of Geological Sciences, The University of Texas at Austin, P. E. Cloud, U. S. Geological Survey, and R. H. Flower, New Mexico Bureau of Mines and Mineral Resources, as follows:

Locality 1-45A
(mixed collection)
"*Helicotoma*" *uniangulata* (Hall)
Ozarkina complanata Ulrich & Bridge
Pelagiella paucivolvata (Calvin)
Rombella
Ribeiria sp.
Clarkeoceras?
Walcottoceras
Trilobite
Hydrozoan (?)

Locality 1-46A
Clarkeoceras?
Ectenoceras
Walcottoceras
Ectenoceras cf. *E. pergracile*

Locality 1-46B
Rhabdoporella

Locality 1-46C
Ophileta sp.
Sinuopea regalis Butts
Conocerina, or early state of *Clarkeoceras*
Ellesmeroceroids

Locality 1-50A
Fragmentary gastropods
Dakeoceras?

Locality 1-50B
Orospira?

Locality 1-50C
Helicotoma cf. *H. uniangulata* (Hall)
Ozarkina typica Ulrich & Bridge
Sinuopea cf. *S. humerosa* Butts
Gasconadia?
Clarkeoceras or *Buehleroceras*
Conocerina
Dakeoceras
Eremoceras, also isolated siphuncles of *Eremoceras*

Locality 1-50D
"*Helicotoma*" sp.
Ozarkina?
Paraplethopeltis sp. Bridge & Cloud
Tanyard nautiloid
Ectenoceras?
Walcottoceras?

Locality 1-51A
Fragmentary gastropods
Sinuopea regalis Butts
Archinacella sp.
Paraplethopeltis depressa? Bridge & Cloud
Indeterminate nautiloid

Locality 1-58B
Ozarkina sp.

Gorman Formation

The Gorman Formation crops out in Cypress Creek valley; the main outcrop is up to a mile wide, dips eastward, and is interrupted by a large Cretaceous outlier. Two small outcrops downstream along Cypress Creek are faulted up against Honeycut rocks; upstream, another outcrop downfaulted against Tanyard rocks passes northward beneath Cretaceous cover to reappear as small inliers. The Cypress Creek belt of Gorman rocks passes northward beneath a Cretaceous ridge to crop out as inliers in the headwater area of Double Horn Creek. A large area of Gorman rocks dips northward in a northeastward-trending graben in the headwaters of Flatrock and Little Flatrock Creeks. West of the graben, a mile-wide belt of Gorman follows the north border of the quadrangle to within half a mile of the western boundary.

Lateral gradation between dolomite and limestone is more prevalent in the Gorman within the Round Mountain quadrangle than anywhere yet mapped in the Llano region. The lower part of the Gorman is mostly dolomite and the upper part is mostly limestone; however, in places in the upper part limestone is absent. In Cypress Creek valley near the middle of the Gorman, a fairly persistent limestone contains the *Archaeoscyphia* zone, confined to one massive bed, in which *Archaeoscyphia* structure is preserved in chert nodules. Elsewhere the zone of *Archaeoscyphia* is in dolomite and is not easily traced.

Dolomite in the Gorman is mostly microgranular; some is fine grained, and rarely is a medium-grained bed seen. It is various shades of light to medium gray, and much of the microgranular dolomite is pastel shades of pinkish gray, yellowish gray, and brownish gray. The limestone is aphanitic, very light gray, and mostly massive. Much of the lower contact of the Gorman is at the base of a massive collapse breccia composed of blocks of microgranular dolomite.

Chert, common throughout the Gorman Formation, is mostly chalcedonic to subchalcedonic, white to various shades of gray, and some brown. White porcelaneous chert is also common and some of the chert is sandy. Scattered sand grains are present in many beds, and the presence of minute quantities of sand is one of the distinctive features of the Gorman and the lower 100 feet of the overlying Honeycut Formation.

The Gorman is sparsely fossiliferous; trilobites were collected from locality 1-39E, and fossils in a mixed collection of Staendebach and Gorman fossils from locality 1-45A are listed above.

Honeycut Formation

The Honeycut Formation crops out in large areas in the Cypress and Double Horn drainage basins and in smaller areas in the Flatrock Creek drainage basin. Much of the Honeycut within the Round Mountain quadrangle has been subdivided into three parts including a lower unit of alternating dolomite and limestone, a middle unit which is mostly dolomite, and an upper unit which is mostly limestone.

The Honeycut within the quadrangle is similar to its appearance in Honeycut Bend of Pedernales River where Cloud and Barnes (1948, p. 314) measured a section. As this publication is out of print, the description of this measured section has been reprinted (Barnes, 1978). In the Honeycut Bend section about half of the lower unit is aphanitic limestone, a quarter microgranular dolomite, and the rest fine- to medium-grained dolomite. The middle unit is about two-thirds microgranular dolomite, and the rest is fine- to medium-grained dolomite and aphanitic limestone. The upper unit in the southeastern part of the quadrangle is mostly aphanitic limestone, but northward dolomite becomes more abundant.

The limestone in the lower unit is mostly light yellowish gray to light gray and medium gray; in the upper unit the color range is wider, with yellowish and brownish grays more common. The fine- and medium-grained dolomite is various shades of medium to dark gray and some light gray. The microgranular dolomite, except in the upper unit, is generally darker than the microgranular dolomite in the Gorman Formation.

Lateral gradation between limestone and dolomite is very common, and north of the county line near the eastern border of the quadrangle, such lateral gradation is especially well displayed. Here limestone beds containing *Archaeoscyphia* grade laterally to dolomite in which *Archaeoscyphia* were destroyed during dolomitization. Just north of Round Mountain quadrangle, large collapse structures are along the Honeycut-Gorman boundary, but collapse structures in this position were not recognized within the quadrangle.

Chert is common in some beds of the Honeycut Formation, and a particularly distinctive type is the chalky "cannonball" chert, which is primarily fossiliferous and commonly is found associated with *Archaeoscyphia*. Chert elsewhere in the Honeycut is in part chalcedonic to subchalcedonic and in part porcelaneous to semiporcelaneous. It is white to various shades of gray and brown.

Fossils collected within the quadrangle from the Honeycut Formation were identified by P. E. Cloud, U. S. Geological Survey, W. C. Bell, Department of Geological Sciences, The University of Texas at Austin, and R. H. Flower, New Mexico Bureau of Mines and Mineral Resources, as follows:

Blanco County

Locality 1-35A
- "*Ophileta*"?
- *Orospira* sp.
- *Polhemia* sp.
- *Hormotoma* sp.
- *Jeffersonia missouriensis* Cullison
- *Archaeoscyphia* sp.

Locality 1-39A
- *Orospira* sp.
- "*Hormotoma*" sp.

Locality 1-39B
- *Orospira* sp.
- "*Hormotoma*" sp.
- *Jeffersonia* n. sp.
- *Bathyurellus?*
- Tarphyceroid cephalopod

Locality 1-39C
- *Ceratopea* sp.

Locality 1-39D
- *Ceratopea capuliformis*
- *Hormotoma*
- Cephalopod siphuncles

Locality 1-40B
- *Rhombella*
- *Ophileta*
- *Hormotoma*
- *Xenelasma*
- Cephalopod siphuncle

Burnet County

Locality 10-8A
- *Hormotoma* sp.
- Unidentified gastropod

DEVONIAN SYSTEM

Stribling Formation

At locality 10-6A, 200 feet west of the Houy ranch house along Double Horn Creek, a small outcrop of the Stribling Formation is exposed in a minor drain. The beds dip steeply, indicating the presence of a collapse structure. The Stribling is composed of limestone, dolomite, and chert, the latter in regular lenses and crosscutting masses that possibly formed along joints. The chert is chalcedonic to subchalcedonic and brownish gray to off-white. The limestone and dolomite are both microgranular and medium gray to brownish gray.

Joint fillings in the Honeycut Formation beneath the Stribling are sandy, glauconitic, grayish yellow limestone similar to the basal part of the Stribling in adjacent areas. However, conodonts must be identified to determine positively the unit to which the crack fillings belong.

DEVONIAN AND MISSISSIPPIAN ROCKS

Houy Formation

Cloud and others (1957, p. 812) state: "The Houy Formation is the representative in Central Texas of the widespread Upper Devonian and Lower Mississippian black-shale succession that includes such well-known eastern and midcontinent deposits as the Chattanooga, Ohio, New Albany, and Woodford shales. The deposits included in the Houy Formation comprise several distinctive lithic types and may well be an unnatural agglomeration of discrete micro-units. It is generally possible, also, through laboratory studies of the conodonts found in them, to assign a probable age to any given thin interval, bed, or pocket of the Houy Formation."

The basal beds of this succession are low Upper Devonian (or possibly high Middle Devonian), and the topmost beds are Mississippian (lower Kinderhook).

Ives Breccia Member.—Ives Breccia crops out in the Double Horn Creek area in the northeastern part of the Round Mountain quadrangle and in the vicinity of Cypress Creek in the southeastern area. In the Double Horn Creek area the Ives is about 3 feet thick and massive with a minimum of chert matrix between large chert clasts; except for the presence of large Ellenburger blocks, it would be difficult to distinguish from the more cherty portions of the Stribling Formation from which it is chiefly derived locally. The way in which Ellenburger blocks up to 5 feet in size could have been emplaced in the Ives Breccia is unclear unless the area in which the Ives accumulated was flanked by cliffs of Ellenburger from which the blocks tumbled.

In the southeastern area south of Cypress Mill, Ives Breccia rests on an inlier of Honeycut rocks. Here the Ives is composed of angular to rounded chert clasts and nodules in a matrix of finer angular cherty material, and the whole appears to have been derived from the underlying Honeycut Formation.

Another outcrop of Ives(?) along the quadrangle boundary north of Cypress Creek is overlapped by Cretaceous rocks, masking its certain identity.

Doublehorn Shale Member.—The principal unit of the Houy Formation is the Doublehorn Shale Member, a black fissile, radioactive (about 0.01 percent equivalent uranium), spore-bearing shale from which, at places northeast of the Round Mountain quadrangle, large silicified pieces of the wood of *Callixylon* have weathered free. Poorly exposed Doublehorn Shale crops out south of Double Horn Creek along the eastern border of the quadrangle and may also be present in places beneath the alluvium along Double Horn Creek. The Doublehorn is well exposed in the bed of Double Horn Creek a short distance to the east on the Spicwood quadrangle (Barnes, in preparation) where it is probably entirely of Devonian age.

Bone bed.—Locally, on the eastern side of the Honeycut inlier south of Cypress Mill, yellowish brown phosphatic rock containing bone fragments, phosphatic pellets, sand grains, and conodonts crops out. Possibly of correlative age is brown phosphorite resting on Doublehorn Shale in the type section of the Houy Formation northeast of the Round Mountain quadrangle. The phosphorite in the type section contains bone fragments, abundant Kinderhook conodonts, and a few Upper Devonian conodonts; however, phosphatic material is likely to occur anywhere in the Houy Formation, including the Ives Breccia Member. The position of the bone bed in the Houy south of Cypress Mill will not be known until the conodonts are studied.

MISSISSIPPIAN SYSTEM

Chappel Limestone

Chappel Limestone rests on the Doublehorn Shale outcrop described above and in turn is overlain by the Barnett Formation. These rocks may be in a collapse structure as the Chappel, the only unit well exposed, crops out in a ring and dips steeply inward. The Chappel is about 2 feet thick and is a crinoidal limestone in which scattered columnals are in a fine-grained matrix. The rock is tough and medium to dark gray with a brownish olive cast.

Although the Chappel Limestone contains conodonts and other fossils, no collections were made within the Round Mountain quadrangle. Correlation of the Chappel has been discussed by Cloud and Barnes (1948, p. 49-52).

Barnett Formation

Although the one outcrop of Barnett mentioned above is very poorly exposed, it is in part well exposed on the Spicewood quadrangle a short distance to the east, where the lower part of the Barnett is composed of alternating chert beds containing orbiculoids and thin shale intervals. Both are very dark gray to black when fresh. The upper part of the Barnett, which becomes progressively less well exposed upward, is black shale with an occasional limestone concretion up to 2 feet in diameter and 6 inches thick. Corals are common near the base of the formation.

PENNSYLVANIAN SYSTEM

Marble Falls Limestone

Limestone facies.—South of Cypress Mill, the basal unit of the Marble Falls is a thin, dark gray, discontinuous limestone which rests on Ives Breccia. Large crinoid columnals are abundant, and the limestone takes a high polish, making it an attractive ornamental stone. A similar limestone in similar stratigraphic position, just north of Cypress Creek and a short distance east on the Spicewood quadrangle, contains brachiopods; these identify the limestone as an equivalent of the Morrow. Some limestone above the spiculite crops out along the eastern border of the quadrangle south of Cypress Mill.

Spiculite facies.—Spiculitic limestone and spiculite, which become more abundant southward, commonly constitute most of the lower part of the Marble Falls Limestone in the eastern and southeastern part of the Llano region. In the Double Horn Creek area the spiculite generally is not well exposed, and the rock seen is mostly dark gray spiculitic limestone in beds 4 to 6 inches thick.

In the Cypress Mill area the spiculite is much better exposed, and spiculiferous limestone is less common. At the surface in this area the spiculite has been leached of calcite and ranges from white on fresh breaks to yellowish, pinkish, and brownish gray depending upon the iron content. The weathered rock ranges from friable tripoli to a minutely porous to compact, blocky, light-colored rock which under the microscope is seen to be composed of cryptocrystalline silica. The spiculite rests directly on various units in the Cypress Mill area including Honeycut Formation, Ives Breccia, bone bed, and the basal limestone unit of the Marble Falls. Such a relationship suggests truncation before the start of spiculite deposition.

MESOZOIC ROCKS

CRETACEOUS SYSTEM (LOWER CRETACEOUS)

Trinity Group

Shingle Hills Formation

Hensell Sand Member.—The Hensell Sand (Barnes, 1948) within the Round Mountain quadrangle rests on all outcropping units of the Pennsylvanian, Ordovician, and Cambrian except the Point Peak Member of the Wilberns Formation. The Hensell is about 100 feet thick north of Cypress Mill and perhaps as much as 110 feet thick in one area in the northwestern part of the quadrangle. The Hensell wedges out against Paleozoic rocks in numerous places in the Cypress Creek drainage basin and in the headwater tributaries of Double Horn Creek.

In general, the Hensell becomes finer grained upward ranging from conglomerate in places at the base to silty clay in the upper part; however, tongues of coarser grained material commonly occur at various levels depending to some extent on the nearness laterally of pre-Cretaceous rock. The kind of pre-Cretaceous rock from which the Hensell is derived influences its local composition and character. The Hensell is commonly various shades of gray, yellowish gray, and greenish gray; reddish material is found at any level.

Glen Rose Limestone Member.—Glen Rose Limestone extends in a broad belt east-west across the Round Mountain quadrangle just north of the central part and occupies large areas on each side of Cypress Creek in the southwestern area. Locally, the Glen Rose rests directly on pre-Cretaceous hills of Cambrian and Ordovician rocks, including all units cropping out in the Cypress Creek and Double Horn drainage basins. The Glen Rose varies in thickness from about 200 feet in the southwestern part of the quadrangle to 340 feet at the western end of Shovel Mountain, which is mostly in the Spicewood quadrangle to the east.

The Glen Rose consists of alternating beds of limestone, dolomite, clay, silt, and sand, or more precisely, beds composed of various proportions and combinations of these materials. The beds vary in their resistance to erosion, producing a "stair-step" topography. The less easily eroded beds of limestone, dolomite, and, locally in its lower part, calcite-cemented sandstone form the tread of the steps, and the softer, less resistant zones between form the risers.

The base of the Glen Rose Limestone is placed at the base of the lowest scarp-forming bed. In tracing the contact, as scarp-forming beds fade, the contact rises to the base of the next higher scarp-forming bed. Most of this contact was traced between observed points with the aid of a stereoscope.

Gulfward from the Johnson City area south of the Round Mountain quadrangle, a thin fossiliferous zone near the middle of the Glen Rose has been called the *Salenia texana* zone by George (1974, p. 17) and Whitney (1952, p. 66). The top of this zone is characterized by a bed containing *Corbula*. Within the quadrangle *Salenia texana* was not found, and the *Corbula* bed was traced westward to the disappearance of *Corbula* some distance before the Hensell Sand contact was reached. For the remaining distance to the Hensell contact, the bed was traced using a stereoscope.

The Glen Rose is best suited to ranching. In general, the vegetation on the Glen Rose is sparser than on the other Cretaceous units, indicating the relative sterility of its soil.

Fredericksburg Group

The Fredericksburg Group within the Round Mountain quadrangle includes Edwards Limestone, Comanche Peak Limestone, and Walnut Clay. The boundaries between the three units are gradational.

Walnut Clay

Walnut Clay containing abundant *Exogyra* crops out at the eastern border of the quadrangle on the western end of Shovel Mountain where it is about 5 feet thick. The only other outcrop within the quadrangle is on Round Mountain where the Walnut is somewhat thinner. The Walnut Clay is highly calcareous, silty, yellowish gray, and abundantly fossiliferous. Its outcrop width is so narrow that it is represented on the map by a line.

Comanche Peak Limestone

Comanche Peak Limestone, 30 feet thick, crops out on Shovel Mountain. The only other outcrop within the Round Mountain quadrangle is on Round Mountain near the western border of the quadrangle. The Comanche Peak is a soft, argillaceous, nodular, extensively burrowed marly limestone that grades downward to marl of the Walnut Clay as the clay content increases.

Edwards Limestone

About 15 feet of Edwards Limestone crops out on Shovel Mountain. The limestone is well bedded, in part cherty, in part magnesian, and varies widely in composition, hardness, and thickness of beds.

CENOZOIC ROCKS

QUATERNARY SYSTEM

Recent Series

Alluvium

Alluvial deposits are mostly confined to Cypress, North Cypress, and Double Horn Creeks. Narrow belts and patches of alluvium are along some of the lesser drainages but are insignificant and have not been mapped. Some of the alluvium is cultivated in the vicinity of Round Mountain and along Double Horn Creek. Along the lower reach of Cypress Creek the stream has developed a braided pattern in the alluvium, which is held in place by cypress trees.

SUBSURFACE GEOLOGY

Cambrian, Ordovician, Devonian, Mississippian, and Pennsylvanian rocks are exposed in more than a third of the quadrangle, and all outcropping units are also present beneath the Cretaceous. The Paleozoic rocks are faulted, and beneath the Cretaceous their structural pattern should be similar.

Samples described between depths of 225 and 1,094 feet were collected from the A. W. Moursund water well which is situated at the highest point on a hill known locally as Poverty Knob. This hill, elevation about 1,425 feet, is 0.47 mile northwest of U. S. Highway 281 at a point 2.1 miles southwest of the Cypress Mill road intersection at Round Mountain. The total depth of the well is 1,170 feet, and it is reported to have bottomed in Hickory Sandstone (however, the driller's log states: "Top of granite indicated at 1,167 feet."). This well penetrated the following units to a depth of 1,094 feet:

Stratigraphic unit	*Thickness in feet*	*Depth in feet*
Cretaceous		
Glen Rose Limestone (estimated from map)	100	0-100
Hensell Sand (estimated from map)	40	100-140
Cambrian		
Wilberns Formation (partly estimated from map)	302	140-442
San Saba Member (partly estimated from map)	155	140-295
Point Peak Member	10	295-305
Morgan Creek Limestone Member	125	305-430
Welge Sandstone Member	12	430-442
Riley Formation	652	442-1,094
Lion Mountain Sandstone Member	52	442-494
Cap Mountain Limestone Member	446	494-940
Hickory Sandstone Member	154	940-1,094

A water well at the Southwest Center in Round Mountain is approximately 980 feet deep. The driller reported that the well bottomed in Hickory Sandstone. Using the table of rock unit thicknesses for the Round Mountain quadrangle (see section on "Water"), it is estimated that about 180 feet of Hickory Sandstone was penetrated in this well.

Information about the Precambrian rocks upon which the Paleozoic rocks lie is limited to gravity data (Barnes and others 1954a, 1954b, 1955). In the area of outcropping Precambrian rocks of the Llano region, Romberg and Barnes (1944) found that gravity minima are associated with Town Mountain Granite masses.

A gravity minimum centered on the Rocky Creek quadrangle (Barnes, 1965) is associated with Town Mountain Granite. The minimum passes into a gravity terrace eastward on the Johnson City quadrangle (Barnes, 1963); the terrace then trends northeastward through the Round Mountain (fig. 1) and Spicewood quadrangles into Burnet County. The configuration of gravity values indicates that most of the quadrangle may be underlain by Town Mountain Granite.

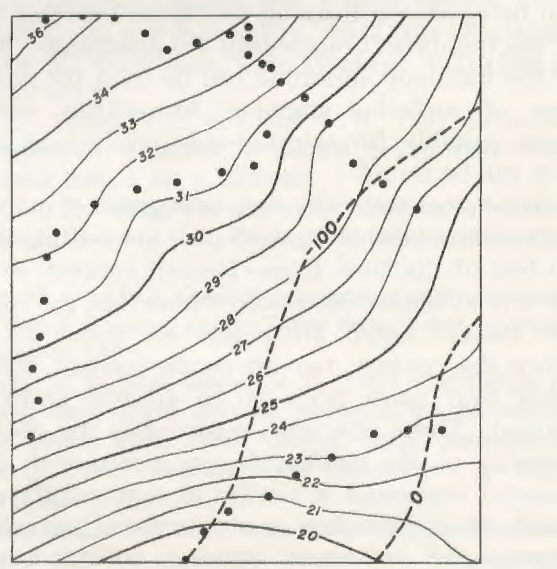

Figure 1. Gravity and magnetic data, Round Mountain quadrangle, Texas. Solid lines—gravitational force in milligals (relative); dashed lines—magnetic force in gammas (relative); dots—points of gravity observation.

MINERAL RESOURCES

The mineral resources of the quadrangle are limited to nonmetallic construction materials and water.

CONSTRUCTION MATERIALS

Dimension stone.—Barnes and others (1947, p. 150, 155) sampled one deposit for dimension stone in the lower part of the dolomitic facies of the San Saba Member of the Wilberns Formation and another in the basal unit of the Marble Falls Limestone south of Cypress Mill.

The dolomite was sampled in the bed of North Cypress Creek about 0.6 mile west of Round Mountain in an area unsuited for quarrying. Although the same ledge crops out where it could be quarried, the rock takes a rather poor polish and is of limited value.

The deposit south of Cypress Mill is a 1- to 4-foot-thick bed of crinoidal limestone which takes a mirrorlike polish. Large off-white crinoid columnals contrast nicely with the brownish gray matrix in the stone, making it of value for ornamental and novelty use. The deposit is small, however.

Crushed stone.—Crushed stone of good quality can be produced from all the Ordovician and most of the Cambrian units within the quadrangle. Much of the Paleozoic dolomite can be used for production of surfacing granules. Attractively colored stone suitable for terrazzo-chip production probably can be found.

Road material.—On the topographic map, 10 excavations labeled "gravel pit" are within 20 to 40 feet of the Glen Rose - Hensell contact, except for one at Shovel Mountain which is at the base of the Hensell Sand. Three pits are about 20 feet below the contact, two are on the contact, and the other four range from 20 to 40 feet above the contact. These pits were made after the geologic mapping of the quadrangle was completed; if the material excavated is similar to that usually excavated, it is probably marly material or caliche-impregnated colluvium. Material of this type is used for surfacing secondary roads and for base course material in highway construction.

WATER

A groundwater survey of Blanco County by B. A. Barnes and Cumley (1942) inventoried 29 wells and six springs within the Blanco County portion of the Round Mountain quadrangle. Of the wells, 25 are within the Hensell Sand - Glen Rose Limestone outcrop area, and of these about 16 penetrate to Ordovician and Cambrian rocks. The rest probably obtain water from the Hensell Sand. Three wells are in the Staendebach outcrop area, and one well is near the Honeycut - Marble Falls Limestone contact. Of the springs, two are in the Staendebach and one each in the dolomitic facies of the San Saba Member, Threadgill Member, Gorman Formation, and Honeycut Formation.

The wells range from 27 to about 480 feet in depth, and the water level at the time of the inventory stood between 3 and 140 feet below the surface. The total dissolved solids range from 214 to 1,447 parts per million with only two wells above 551 parts per million, both of which are high in nitrate.

Follett (1973) reexamined the groundwater resources of Blanco County and inventoried an additional 16 wells within the Blanco County portion of the Round Mountain quadrangle. Of these, 13 produce from the Ellenburger - San Saba interval and one each produces from the Hensell Sand, Hickory Sandstone, and Carboniferous to Devonian interval. Depths of these wells range from 31 to 1,100 feet, and water level stood from 10 to 175 feet below the surface at the time of measurement. Total dissolved solids were not determined, but on the basis of the constituents determined probably do not exceed 600 parts per million.

Hensell Sand is not everywhere present beneath the Glen Rose Limestone but is present in low places in the pre-Cretaceous topography. In some of these water may be present. The lower part of the Hickory Sandstone is water bearing in some parts of Central Texas. Where Paleozoic rocks crop out, the depth to the water-bearing part of the Hickory Sandstone can be judged from the following table of rock unit thicknesses (Bridge and others, 1947; Cloud and Barnes, 1948; Barnes, 1952a, 1956; Barnes and Bell, 1977):

	Thickness (feet)
Pennsylvanian System—	
Marble Falls Limestone	50±
Mississippian and Devonian Systems	0-20
Ordovician System (Ellenburger Group)—	
Honeycut Formation	600±
Gorman Formation	480
Tanyard Formation	475

Cambrian System—	
Wilberns Formation	580-600
San Saba Member	360-430
Point Peak Member	20-80
Morgan Creek Limestone Member	140-145
Welge Sandstone Member	10
Riley Formation	730-790
Lion Mountain Sandstone Member	45-55
Cap Mountain Limestone Member	470-520
Hickory Sandstone Member	220-270

Some water is present in the other Paleozoic rocks in fractures, solution channels, and perhaps in some of the slightly porous coarse-grained dolomite, but finding it will be fortuitous.

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APPENDIX

SAMPLE DESCRIPTIONS

A. W. Moursund Irrigation Well on Poverty Knob

	Depth in feet
Limestone—granular, slightly glauconitic, some pyrite, dark mica common, light to medium gray, some light brownish gray; in part dark yellowish orange as if weathered (3 samples)	225-252
Limestone—similar to above, in part light brownish gray, a few chips contain scattered brown dolomite rhombs	252-263
Limestone—granular, very glauconitic in upper sample, less glauconitic downward, dark mica common in upper sample, more abundant downward, medium gray with brownish cast, slightly lighter downward; greenish gray shale very scarce in lower two samples (3 samples)	263-294
Limestone and siltstone—limestone, granular, in part oolitic, in part contains brown dolomite rhombs, very light pinkish gray; siltstone, calcareous, very micaceous, medium dark gray; lower sample mostly limestone (2 samples)	294-315
Limestone—granular, some glauconite and dark mica, light brownish gray, in part brownish gray in middle sample; some greenish-gray shale (3 samples)	315-347
Limestone—coarse grained, oolitic, glauconite common, very large grains in lower two samples, very light gray to brownish gray, orange to red weathered limestone in middle sample may be caved (3 samples)	347-378
Limestone—in part coarse grained as above, some pink; some fine grained, glauconitic, medium gray	378-389
Limestone—mostly fine grained, glauconitic, medium gray	389-399
Limestone—coarse grained, glauconitic, in part oolitic, pink to pinkish brown and moderate brown, some medium gray (2 samples)	399-420
Limestone—coarse grained, sandy, sand medium to coarse, well rounded, some glauconite, moderate brown	420-431
Sandstone—fine to medium grained, a few coarse grains, glauconite scarce, light gray	431-441
Greensand and sandstone—in upper sample some sandstone as above; mostly greensand, calcareous, sandy, sand grains coarse in upper sample, medium in lower sample, dusky green, in part dark brown in upper sample (2 samples)	441-462
Limestone and greensand—some greensand, fine to medium grained, dusky green; mostly limestone, coarse grained, glauconitic, light brown	462-473
Limestone—fine to medium grained, slightly to very glauconitic, phosphatic brachiopod fragments common	473-483
Limestone-fine grained, slightly to very glauconitic, some siltstone flakes, light brown in part with greenish cast	483-494
Limestone—medium grained, glauconitic becoming less glauconitic downward, mostly oolitic, light to moderate brown in upper two samples, pale yellowish brown in rest; some fine grained, finely glauconitic, medium yellowish brown limestone from 567-578 (9 samples)	494-588
Siltstone and limestone—in upper sample some limestone as above; mostly siltstone, calcareous, slightly glauconitic, moderate to dark yellowish brown (4 samples)	588-625
Limestone and siltstone—in upper sample some siltstone as above; mostly limestone, granular, slightly glauconitic, pale yellowish brown, lower 4 samples oolitic, in lowest sample a few chips contain fine sand (6 samples)	625-685
Limestone and sandstone—limestone in part granular, sandy, pale yellowish brown; some sandstone, very fine grained, very light gray	685-695
Sandstone and limestone—some limestone as above; mostly sandstone, very fine to fine grained, calcareous, a few chips have grains with bronzy luster, glauconite scarce, very light gray to pinkish gray	695-705
Limestone and sandstone—mostly limestone, granular, in part glauconitic, pale yellowish brown; sandstone similar to above but more glauconitic	705-715
Sandstone—very fine to fine grained, calcareous, glauconitic becoming less glauconitic downward, light olive gray, in lower sample some limestone, coarse grained, glauconitic, sandy (3 samples)	715-765
Sandstone, siltstone, and limestone—some limestone in upper sample similar to above; mostly sandstone, very fine grained verging on siltstone, some fine-grained sandstone in lower sample, glauconitic, light olive gray to olive gray (4 samples)	765-845
Sandstone—very fine to fine grained, calcareous and glauconitic becoming less calcareous and glauconitic downward, olive gray in upper part, light olive gray in lower part (5 samples)	845-947
Sandstone—similar to above except for presence of some medium sand and lack of calcareous cement	947-968
Sandstone—mostly loose, medium sand, very light gray; some chips similar to above	968-989
Sandstone—loose, fine to medium sand, very light gray	989-1010
Sandstone—loose, very fine to medium sand, a few coarse grains, secondary enlargement common, very light gray; some siltstone in lower sample (2 samples)	1010-1052
Sandstone—loose, sand somewhat coarser than above; in bottom sample a few chips very fine to fine grained, silty, very micaceous, mica dark green; light olive gray (2 samples)	1052-1094